

**THE AMERICAN GENUS MYCOTROGUS: A SYNOPSIS, A NEW SPECIES FROM CUBA, AND A NOTE ON A LARVA**

(COLEOPTERA: TENEBRIONIDAE)

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Many beetles of importance to stored products in North America are contained in the Ulomini, and those species have been discussed very often in the literature. But other species and genera of the tribe have been seriously neglected. Sixty years have passed since an American taxonomic paper was published on the tribe, except for the description of new species; and except for determination keys to genera, the relationships of ulomine genera have not been discussed in the last 90 years. One of the first steps toward adequate knowledge of intratribal relationships is a study of each genus and its members. *Mycotrogus* is one of the least known ulomine genera.

Most specimens used in this study are in the collection of the United States National Museum. The others, indicated below by (CAS), are in the California Academy of Sciences. The latter specimens were kindly lent by Hugh B. Leech, and to him I tender my thanks. Also, I thank J. A. G. Rehn for courtesies during my visit to the Academy of Natural Sciences of Philadelphia to examine the lectotype of *Mycotrogus angustus* Horn.

***Mycotrogus* Horn**

*Mycotrogus* Horn, 1870. Trans. American Philos. Soc. (new series) 14: 364, 367.

*Description*.—Shape elongate, subparallel-sided, width of pronotum subequal to width of elytra, lateral borders of pronotum almost continuous with lateral borders of combined elytra. Head with anterior border of epistoma straight or almost so; male with protuberance above each eye; female without protuberance, evenly rounded. Eye strongly emarginate, dorsal and ventral lobes large. Antenna slender, gradually enlarged apically; distal segments subtriangular and loosely fitting. Maxillary palpus with terminal segment strongly or weakly divergent distally. Labium of same shape in male and female, with mentum small, very strongly convex, not bordered with minute setae; surface with long, golden, erect setae which curve medially; in male with a coarse central puncture which contains a short bristlelike seta. Pronotum in dorsal view wider than long; anterior angles distinct; posterior angles approximately right-angled; lateral border with a distinct carina and sulcus; posterior border strongly sinuate; dorsal surface either with punctures of approximately the same small size or with punctures of two obviously different sizes, large laterally and small over whole surface. Prosternum with intercoxal process narrow, elongate, almost flat, acute apically. Mesosternum with a strong V-shaped notch to receive prosternal process, walls of notch very thick. Procoxal cavity circular in ventral view. Profibia weakly compressed anteroposteriorly, gradually expanded dorsally, convex on both anterior and posterior surfaces; dorsal border entire, with a single row of very short, very coarse setae; ventral border with a very narrow row of fine, depressed, dense setae; posterior surface with elongate punctures and a dull microsculpture; apex with relatively long spurs. Protarsus with basal segments asymmetrical, the

ventroanterior, apical angle projecting. Metafemur either subelliptical in both sexes, or strongly sinuate ventrally in the male and weakly sinuate in the female. Elytra in dorsal view with lateral borders straight throughout most of their lengths and weakly converging posteriorly, apex evenly rounded; pseudopleural carina completely visible in dorsal view; pseudopleuron relatively wide and attaining apex of elytra; striae very weakly sulcate and composed of small punctures; intervals almost flat, not carinate, with very fine punctures. Metathoracic wings complete. Abdomen with intercoxal process of first visible sternum broad and weakly rounded apically; last visible sternum not sulcate. Male genitalia with the paramere either lightly sclerotized and subcylindrical or strongly sclerotized and depressed and sinuate apically. Posterior digestive tract with circular or sinuous rectal valve.

*Type species.*—*Mycotrogus piceus* Horn, 1870. Subsequent designation by Gebien (1940, Mitt. Münchner Ent. Ges. 30(2) : 768(575)).

In current catalogues *Mycotrogus* is placed near *Alegoria*, but the two genera actually have little in common. *Mycotrogus* is better placed near the end of the Ulomini with *Ulosonia* and *Phayllus*. These three genera are similar in the following characteristics: The asymmetrical protarsal segments, the pseudopleuron extending to the elytral apex, the simple mentum, a prominence above the eye in the male, and a prolonged intercoxal process of the prosternum. In addition, *Ulosonia* has a pronotum with punctures of two sizes.

The species of *Mycotrogus* separate into two groups: In the first, *paripunctatus*, with approximately uniform pronotal punctures, sexual dimorphism in the metafemur, and a heavily sclerotized, sinuate paramere; and in the second group, *mentalis*, *angustus*, and *piceus*, with the pronotal punctures being of two sizes, the metafemur being alike in the sexes, and with a lightly sclerotized, rather straight paramere. The differences in the metafemur and genitalia prompted me to isolate *paripunctatus* in a new genus, but I finally became convinced that it is better at present to put this species in *Mycotrogus*. Two alternatives in the eventual solution of this problem should be considered, either the splitting of *Mycotrogus* into two genera, or the uniting of *Mycotrogus*, *Phayllus*, and possibly *Ulosonia* into one genus. The morphological gap previously existing between *Mycotrogus* and *Phayllus* will probably be closed by the new species *Mycotrogus paripunctatus*. I am not prepared to solve the problem now, and I think that our knowledge of the Ulomini is not sufficient to allow solution. By keeping *paripunctatus* within *Mycotrogus* we can at least avoid another generic name, and also have what appear to be closely related species together.

KEY TO THE KNOWN SPECIES OF MYCOTROGUS  
(*Mycotrogus piceus* is not included)

1. Pronotum on dorsal surface with punctures small, of approximately uniform size ..... *paripunctatus*, new species
- Pronotum on dorsal surface with punctures both small and very large ..... 2

2. Pronotum in dorsal view with lateral borders almost straight in posterior two-thirds and moderately convex in anterior one-third ..... *angustus* Horn  
 Pronotum in dorsal view with lateral borders weakly convex in posterior three-fourths and strongly convex in anterior one-fourth ... *mentalis* Blaisdell

***Mycotrogus paripunctatus* new species**

This species is easily distinguished from other members of the genus by its approximately uniform pronotal punctures, hence the specific name. It is larger than the others, the shape of the pronotum in dorsal view is different, and the shape of the metafemur is sexually dimorphic. The paramere of the male genitalia is very different.

**Holotype, male.**—Black with a brownish hue, shiny; elongate; subparallel-sided, lateral borders of pronotum and elytra almost continuous. *Head.* Epistoma with anterior border straight medially, then evenly convex to region above antennal insertion; with surface convex and having a shallow longitudinal depression; epistomal sulcus relatively deep; a weak protuberance above each eye, the area between protuberances concave; dorsal surface with punctures fine on epistoma, coarse between and posterior to eyes. Eye strongly emarginate on anterior border, ventral area obviously larger than dorsal area. Antenna with segments 2-5 nearly cylindrical, each very gradually wider at apex; segments 6-11 obviously wider than 2-5, progressively becoming weakly compressed, broadly triangular, and gradually wider; segment 6 with width of 0.15 mm., segment 10 with width of 0.19 mm.; segments with following lengths, in millimeters: 2—0.10, 3—0.15, 4—0.15, 5—0.15, 6—0.15, 7—0.15, 8—0.15, 9—0.15, 10—0.125, 11—0.175; segments covered with golden setae of moderate length and density. Maxillary palpus with apical segment (fig. 1) strongly divergent distally. Mentum with surface convex; laterally with long setae curving medially, center with a coarse puncture which contains a short bristle.

*Thorax.*—Pronotum in dorsal view (fig. 2) wider than long; anterior border strongly, evenly concave, with fine sulcus on lateral third; anterior angles obtuse, though definite; lateral border almost straight on posterior half, thence strongly convex on anterior half, strongly carinate; posterior angles weakly acute; posterior border strongly bisinuate, finely carinate; surface strongly convex transversely on lateral thirds, weakly convex on medial third, weakly convex longitudinally, with weak longitudinal depression extending a short distance from near posterior border at approximately one-third of width from posterior angle; with fine punctures of approximately uniform size except becoming slightly finer toward borders, without coarse punctures. Pronotal hypomeron finely, sparsely punctured, weakly wrinkled. Prosternum with dense, small punctures; intercoxal process simple, apex acute but without nodule. Mesothoracic and metathoracic sterna and pleura finely punctured, punctures denser laterally.

*Legs.*—Profemur strongly narrowed basally, in anterior view the ventral border sinuate. Protibia (fig. 3) slightly more slender and dorsal border slightly straighter than in other species; posterior surface dull, with elongate coarse punctures apically, punctures becoming smaller toward base, with dense golden setae subapically on ventral surface. Protarsus (fig. 3) slender, slightly longer than in other species; first segment strongly projecting on anterodistal corner

of ventral surface, other segments gradually less strongly projecting at same corner. (Note that figure 3 is a ventral view of tarsus, not a lateral view.) Mesofemur in anterior view with dorsal border sinuate basally. Mesotibia slightly enlarged toward apex. Mesotarsus normal, without ventral projections on segments. Metafemur in anterior view (fig. 6) with dorsal border evenly convex; ventral border strongly sinuate. Metatibia slightly enlarged toward apex. Metatarsus normal, without ventral projections on segments.

*Elytra* with lateral borders very weakly narrowed posteriorly on basal two-thirds, then strongly convex to apex which is weakly emarginate at posterior end of suture; with transverse convexity strong laterally; striae composed of coarse, round punctures, connected by a shallow sulcus, depth and coarseness of striae becoming slightly greater laterally; intervals weakly convex near suture, becoming more convex laterally, eighth interval not more convex than adjacent intervals, all intervals with very fine punctures.

*Abdomen* finely, densely punctate on first three visible sterna, very finely, densely punctate on last two visible sterna. Genitalia not examined.

**Allotype, female.**—Head without protuberance above each eye, the area between eyes therefore convex. Maxillary palpus with apical segment slightly narrower than in holotype. Mentum without central seta, but with other setae as in holotype. Protarsus with first segment having ventral projection on anterodistal corner smaller than in holotype; projection on second segment very small; other segments without projections. Metafemur in anterior view (fig. 7) with ventral border weakly sinuate. Antenna slightly shorter than in holotype.

**Variation.**—Paratypes, males. No variations from holotype, except in size, are noticeable. The following structures were not dissected in the holotype. Male genitalia with tegmen (figs. 4, 5) heavily sclerotized, dark; pars basalis elongate, troughlike membranous ventrally; paramere in dorsal view with lateral borders gradually converging posteriorly, then strongly sinuate to form angular apex; paramere in lateral view slender, sinuate; penis small, membranous, difficult to delimit. Posterior digestive tract (fig. 8) with a simple, circular rectal valve (see Appendix I).

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***Mycotrogus paripunctatus*** new species (figs. 1-8). Fig. 1, Apical segment of maxillary palpus; fig. 2, Pronotum, dorsal view; fig. 3, Left protibia, posterior view, and left protarsus, ventral view; fig. 4, Tegmen of male genitalia, ventral view; fig. 5, Tegmen of male genitalia, lateral view; fig. 6, Metafemur of male, anterior view; fig. 7, Metafemur of female, anterior view; fig. 8, Part of posterior digestive tract. ***Mycotrogus mentalis*** Blaisdell. Fig. 9, Pronotum, dorsal view. ***Mycotrogus angustus*** Horn (figs. 10-15). Fig. 10, Pronotum, dorsal view; fig. 11, Apical segment of maxillary palpus; fig. 12, Tegmen of male genitalia, ventral view; fig. 13, Tegmen of male genitalia, lateral view; fig. 14, Metafemur of male and female, anterior view; fig. 15, Part of posterior digestive tract. **Larva, possibly *Mycotrogus angustus*** Horn (figs. 16-21). Fig. 16, Antenna; fig. 17, Hypopharyngeal sclerome of labium, adoral view; fig. 18, Right prothoracic leg, posterior view; "a", the position of a seta on mesofemur; "b", the position of a seta on mesotibia; fig. 19, First abdominal segment, lateral view; fig. 20, Ninth abdominal segment, lateral view; fig. 21, Ninth abdominal segment, dorsal view.



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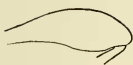
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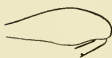
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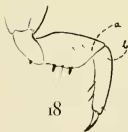
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**Measurements.**—The following order is maintained in each measurement: First, holotype male; second, paratype male; third, paratype male; and fourth, allotype female. Millimeters are the units of measure. Approximate total length: 5.9, 5.7, 5.6, 5.3. Medial length of head, from anterior epistomal border to imaginary line between posterior borders of eyes: 0.65, 0.55, 0.60, 0.55. Medial length of pronotum: 1.5, 1.4, 1.2, 1.3. Maximum length of elytra: 4.0, 4.0, 3.8, 3.6. Maximum width, at elytral humeri: 2.4, 2.2, 2.2, 2.1.

**Specimens studied.**—Holotype male (USNM Type No. 65950), Cayamas, Cuba; 14-1, E. A. Schwarz collector, in *Ceiba*. Allotype female, and two paratypes males, all with the same data as on holotype.

The name Cayamas is used for at least two populated localities in Cuba. The Cayamas at which Schwarz collected is at Latitude 22° 15" N., Longitude 80° 48" W., in Las Villas Province (formerly called Santa Clara Province). For Schwarz's description of the Cayamas region, see Sherman (1929, Jour. New York Ent. Soc. 37(3): 330-359).

#### ***Mycotrogus angustus* Horn**

*Mycotrogus angustus* Horn, 1870. Trans. American Philos. Soc. (new series) 14: 368.

The species *angustus* is relatively common. It is externally distinct in the shape of the pronotum, the moderate convexity, the shiny luster, and the relatively moderate size of the large pronotal punctures.

**Diagnosis.** Reddish brown, shiny. Head in dorsal view with anterior border of epistoma weakly concave; in male with protuberance above eye relatively weak; in female without protuberance, evenly convex. Maxillary palpus with apical segment (fig. 11) weakly divergent distally. Pronotum in dorsal view (fig. 10) with lateral borders almost straight in posterior two-thirds, then moderately convex in anterior one-third; surface moderately convex, with very large punctures laterally and fine punctures over whole surface. Metafemur elliptical, in anterior view (fig. 14) with ventral border convex in both sexes. Male genitalia with tegmen (figs. 12, 13) lightly sclerotized; paramere sub-cylindrical, with borders evenly arcuate, not sinuate. Posterior digestive tract (fig. 15) with a sinuous rectal valve (see Appendix I). Measurements: Approximate total length, 3.9-4.8 mm.

**Specimens examined.**—*Arizona*: Ft. Yuma, 27-1, Hubbard and Schwarz Collection, 2 specimens; Sabino Canyon, 3-29-1919, in dead *Cercidium torreyanum*, G. Hofer collector, 1 specimen; Santa Catalina Mts., 16-5, Hubbard and Schwarz Collection, 2 specimens. *California*: Painted Canyon, near Indio, 1-2-39, Van Dyke Collection (CAS), 4 specimens; Palm Springs, 5-3, Hubbard and Schwarz Collection, 15 specimens.

In addition, I have examined a male specimen labeled "Ar." in the Horn Collection of the Academy of Natural Sciences of Philadelphia;

I hereby designate it Lectotype No. 3989 for the species *Mycotrogus angustus*. It contains the identification label of Horn. I cannot locate the other specimens Horn used in his original description. In that original description Horn says specimens found at "Camp Grant, Arizona, under Cottonwood bark." In the previous century authors commonly published more collecting data than they put on labels on specimens.

Schwarz wrote to Hubbard concerning the California specimens collected by the latter, "March 5, 1896 In dead palm bud, Palm Canyon—*Mycotrogus angustus* Horn (Tenebrionid). Two specimens were found by you before at Yuma under willow bark. . . ." The statements between quotation marks are from the collected letters published by Sherman (1929, Jour. New York Ent. Soc. 37(3): 266).

The locality Santa Catalina Mountains is my interpretation of the label "Catal Mts., Ariz." on specimens in the U. S. National Museum. Most of the Hubbard and Schwarz Collection labels did not include a year, but I did find in Hubbard's field notes in the archives of the National Museum that he was in Sabino Canyon of the Santa Catalina Mountains on May 16, 1897. I assume the label applies to that particular collecting trip, for I cannot find "Catal Mts." on a map or in a gazetteer.

One male specimen from 5 miles south of Miraflores, Baja California, Mexico, VII-10-1938, Michelbacher and Ross collectors (CAS), appears to be *angustus*, at first glance. However, Blaisdell had identified it as *mentalis*, according to an attached label. It resembles *angustus* in the shape of the lateral borders of the pronotum and by the moderate curvature of the dorsal surface of the pronotum, but it has the more pronounced male protuberance above the eye as in *mentalis*. It is intermediate in color between *angustus* and *mentalis*. The large punctures of the pronotum are even smaller than those of *angustus*. I prefer to identify it as "possibly *angustus*" until more specimens and more complete distributional data for both species are available.

#### ***Mycotrogus mentalis* Blaisdell**

*Mycotrogus mentalis* Blaisdell, 1923. Proc. California Acad. Sci. (4) 12 (12): 279.

The species *mentalis* is externally distinct in the shape of the pronotum, the strong convexity, the dull luster, and the relatively large size of the large pronotal punctures.

**Diagnosis.** Brownish black, with a dull luster. Head in dorsal view with anterior border of epistoma weakly concave; in male with protuberance above eye relatively strong; in female without protuberance, evenly convex. Maxillary palpus with apical segment weakly divergent distally, same as in *angustus* (fig. 11). Pronotum in dorsal view (fig. 9) with lateral borders weakly convex in posterior three-fourths, then strongly convex in anterior one-fourth; surface strongly convex, with very large punctures laterally and fine punctures over whole surface. Metafemur elliptical, in anterior view with ventral border convex in both sexes, same as in *angustus* (fig. 14). Male genitalia with tegmen more heavily



sclerotized than in *angustus*; paramere subcylindrical, with borders evenly arcuate, not sinuate, same as in *angustus* (figs. 12, 13). Posterior digestive tract with a sinuous rectal valve, same as in *angustus* (fig. 15) (see Appendix I). Measurements: Approximate total length, 5.4-5.9 mm.

*Specimens examined*.—*Baja California*: Las Animas Bay, May 8, 1921, J. C. Chamberlin collector, 4 paratypes, male and female, (CAS). *Arizona*: Santa Catalina Mts., 16-5, Hubbard and Schwarz Collection, 1 specimen.

The holotype of *mentalis* is also from Las Animas Bay; it is in the California Academy of Sciences, but I have not examined it. Blaisdell (1943, Proc. California Acad. Sci. (4)24(7): 269) gave additional localities for this species; all are in the southern half of Baja California, the most northern being Santa Rosalia. The above addition of southeastern Arizona to the known distribution creates a large geographical gap. More specimens and localities should resolve this problem.

#### SPECIES INQUIRENDA

##### *Mycotrogus piceus* Horn

*Mycotrogus piceus* Horn, 1870. Trans. American Philos. Soc. (new series) 14: 367.

This species is unknown to me. The holotype and only specimen Horn used in his original description is not in the Academy of Natural Sciences of Philadelphia, the Museum of Comparative Zoology at Harvard, or the California Academy of Sciences. I assume Blaisdell never obtained specimens of *piceus* for there are none in the California Academy of Sciences; he must have used Horn's original description when making comparisons with his own new species.

Blaisdell's *mentalis* might eventually be synonymized with *piceus* Horn. Specimens of the former agree somewhat with the original description of the latter. In addition, the recording of *mentalis* from Arizona eliminates in part the previously recorded geographical gap between the two species. Even so, for the following reasons I prefer not to synonymize the two species: Horn's description is rather short; the distribution of *piceus* in California is not known (Horn listed only the State); the distribution of *mentalis* must be better known, especially in the United States, now that it is recorded from Arizona; and Horn's holotype might yet be found. The status of *inquirenda* is most unfortunate, for *piceus* is the type species of *Mycotrogus*.

#### APPENDIX I—RECTAL VALVES

The differences in the rectal valve mentioned above are very interesting. Every tenebrionid I had previously dissected possessed the circular type of rectal valve (fig. 8). Finding the sinuous type (fig. 15) was quite a surprise.

In tenebrionids the posterior digestive tract, the proctodaeum, suddenly turns to become directed anteriorly, then again suddenly turns to become directed posteriorly; this last straight section extends from approximately the base of the abdomen to the anus. In the



basal three-fourths of this final straight section the cuticular layer (that layer remaining after treatment with KOH) is transparent and has small transverse wrinkles. Then a longitudinally wrinkled section extends to the anus. The transversely and longitudinally wrinkled sections are separated by a slender, heavily sclerotized ring embedded in the cuticle. This ring was called the rectal valve by El-Kifl (1953, Bull. Soc. Fouad Ent. 37: 223, figs. 54, 55). The Malpighian tubules lie on the outside of the transversely wrinkled section and terminate at the rectal valve. The typical position of the Malpighian tubules in *Tenebrio molitor* is given by Marcus (1930, Zeitsch. morph. okul. Tiere, Abt. A, 19(4): fig. 38) in his study of the tubules in beetles; their position in *Tribolium confusum* is given by El-Kifl (op. cit., p. 225, fig. 55).

*Mycotrogus paripunctatus* has a circular rectal valve (fig. 8), which is the usual type. In the dried specimen which I dissected, the Malpighian tubules were obscured, hence they are not shown on the illustration. The rectal valve of the other species is very odd. *Mycotrogus angustus* has a strongly sinuous rectal valve (fig. 15). The valve is a little closer to the anus than in *paripunctatus*, causing the longitudinally wrinkled section to be slightly shorter. The valve is composed of a comparatively broad, sclerotized band, with six deep sinuities. The valve is attached to the transversely wrinkled section in such a manner that six pockets are formed along the anterior edge of the valve. Into each of these pockets is tucked the distal end of a sinuous Malpighian tubule.

#### APPENDIX II—A LARVA TENTATIVELY IDENTIFIED AS MYCOTROGUS ANGUSTUS

A larva was pasted on the cardboard point that held one of the adult specimens of *angustus* Horn. The accompanying label for both read: Painted Canyon, near Indio, California, January 2, 1939, Van Dyke Collection (CAS). I can assume only that the larva was collected with the adult. Only if the larva had been reared to adulthood could we be sure of the association of the two stages. However, because the larva is undescribed, because it is a ulomine, and because there is a very good chance that it is *angustus*, I am describing and identifying it as "possibly *Mycotrogus angustus*." When the true identity of the larva is known, a more exact name can be attached.

*Head*.—Dorsal surface with two long, slender setae anteriorly and one posteriorly on each side of midline. Labrum without transverse carina, with two slender setae on each side of midline on sclerotized area; membranous anteriorly. Clypeus with two slender setae on each side. Eyes very faintly evident. Antenna (fig. 16) slender, with segment 2 much slenderer than 1, segment 3 long and slender. Mandible stout; with blunt tooth or angulation on dorsal cutting edge at half of distance from apex to molar area, with acute tooth forming apex and with one smaller subapical tooth ventrally; area opposite to cutting edge with two contiguous setae near dorsal articular fossa and one stiff seta near ventral articular process. Maxilla stout, palpus of moderate length, last segment slender; lacinia extending to half length of second palpal segment, medial border with long, stiff setae. Labium stout; palpus of moderate length; hypopharyngeal

sclerome (fig. 17) with lateral borders converging from base, apical border angulate medially, concave on adoral surface, especially basally.

*Legs.*—Procoxa (fig. 18) long, projecting, with long, slender setae which are especially numerous on anterior surface. Protrochanter (fig. 18) stout, with a short, coarse, spinous seta on ventral surface at one-third of length from apical border. Profemur (fig. 18) stout, with two coarse, spinous setae of moderate length on ventral surface and with a long slender seta between them; posterior surface with two short slender setae on apical third. Protibia (fig. 18) slender, with two long setae of moderate coarseness on ventral surface on apical half of length; with a slender seta on dorsal surface near apex. Protarsungulus (fig. 18) slender, darkened apically. Mesothoracic and metathoracic legs subequal to prothoracic leg in length but more slender; both otherwise like prothoracic leg except as follows: mesofemur and metafemur with a coarse seta on posterior surface near apical border (at position "a" in figure 18), mesotibia and metatibia with only the more basal seta on ventral surface and with a coarse seta on the postero-dorsal surface at approximately two-fifths of the length from the base (as position "b" in figure 18).

*Thoracic and abdominal segments.*—Terga of thoracic and anterior abdominal segments sclerotized or darkened on anterior half, those of posterior abdominal segments gradually becoming sclerotized over complete surface and much darker. Protergum with long, slender seta at anterolateral corner, one near posterolateral corner, one on anterior margin of sclerotized area on each side of midline, and one on the vague lateral line. Mesothorax and metathorax shorter than prothorax; each tergum with long, slender seta at posterolateral corner, one at lateral third on posterior border, one near midline on posterior border, and one on vague lateral line. Abdominal segments 1 (fig. 19) and 2 having tergum with long, slender seta at posterolateral corner, one near midline on posterior border, and one on lateral line. Abdominal segments 3-8 having each tergum with long, slender seta at posterolateral corner, and one near midline on posterior border. Lateral line on abdominal segments 1-8 distinct, though not dark. Spiracles on abdominal segments circular, near anterior limit of lateral line and separated from lateral line approximately by distance equal to width of lateral line. Diameter of spiracles on segments 2-8 approximately two-thirds diameter of spiracle on segment 1. Segment 9 in dorsal view (fig. 21) in the form of an equilateral triangle, in lateral view (fig. 20) slightly curved dorsally at apex; apex with a very coarse, spinous seta, on each side of which is a smaller coarse seta, and laterally approximately one-third length from apex with coarse seta placed on short tubercle; other setal arrangement as in illustrations; anal opening with a pair of short membranous papillae.

*Measurement.*—Total length approximately 7.7 mm.